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IMPACTS OF STRIKE REPLACEMENT BANS IN CANADA

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In the labor relations area no issue generates as much controversy and division between labor and management as does the legislative ban on replacement workers. In the United States, the issue of a ban on permanent replacement workers has come before Congress four times since 1988, although the only action taken has been an executive order in 1995, banning the government from doing business with firms that use permanent replacements (Cramton and Tracy, 1998). In Canada, where labor matters are under provincial jurisdiction, legislative bans on *permanent* replacement workers exist in most jurisdictions (except New Brunswick, Nova Scotia and Prince Edward Island), either directly or indirectly by mandating that striking workers have the right to their job once the strike is over -- they cannot be permanently replaced by replacement workers who may have been temporarily hired during the strike. The more stringent ban on the use of *temporary* replacement workers also has been in place in Quebec since 1978, in British Columbia since 1993, and in Ontario between 1993 and 1995[1].

The issue is particularly important since the legislative ban is a variable that is under a substantial degree of policy control, including its various dimensions pertaining to permanent replacements, temporary replacements and professional strikebreakers. It can be changed, as evidenced by its recent adoption in British Columbia, and especially in Ontario where the legislation was instituted in 1993 and rescinded in 1995. The issue is of particular policy relevance since all actors in the industrial relations system are under intense pressure especially with respect to such labor policy variables. Unions are often on the defensive to ensure their very survival; hence they tend to regard bans on replacement workers as essential to safeguard their main weapon and what they regard as a fundamental right -- the right to strike. Employers are under increased competitive

pressures from forces such as global competition, trade liberalization, and deregulation; hence, they are equally adamant about what they regard as an essential right -- the right to carry on production. Governments are also under intense pressure given that the increased mobility of both physical and financial capital is leading to inter-jurisdictional competition (both across countries and within countries) for investment and the jobs associated with that investment. In such an environment, governments may be under pressure to reduce their costly regulations including labor regulations, especially if the regulations are ones that can have impacts on visible forms of conflict such as strikes. In a world of global competition, just-in-time delivery and integrated production, strikes can mean a permanent loss of production, perhaps to offshore competitors. More frequent and prolonged strikes can also be a negative sign for investors who are likely to pay more attention to such overt forms of conflict, compared to the more subtle forms that can prevail if the overt forms are suppressed or if labor disputes take on a less visible form such as working during a "holdout" period after the contract has expired[2].

In such an explosive environment, it is not surprising that all actors in the industrial relations system have an intense interest in policy variables like legislative bans on replacement workers. This is especially the case when the policies can have a substantial impact on important industrial relations outcomes like bargaining power, wages, strike incidence and strike duration. Our empirical evidence highlights that this is the case -- in fact, the legislative bans on replacement workers in Canada are by far the most important policy variables with respect to all three dimensions -- wages, strike incidence and strike duration. In such circumstances, the controversy surrounding this policy is understandable -- indeed expected.

Data and Empirical Analysis

Our empirical results reported here focus exclusively on the impact of legislative bans on replacement workers, including temporary replacement workers, as they exist in Quebec since February 1978, British Columbia since January 1993, and Ontario from January 1993 to November 1995. Since our data is for the period January 1967 to March 1993, however, it is important to emphasize that it is difficult to precisely estimate the impact of this variable with so few observations (14.5 percent of contracts) when the ban was in place. More importantly, its impact is identified mainly from the Quebec experience, since the laws in British Columbia and Ontario were in place for only a brief part of the period of our data. While we have controlled for a wide range of other factors believed to influence wages and strikes, the fact remains that our results may still be heavily influenced by the experience of Quebec.

Our results are based on including a variable indicating the presence of a legislative ban on replacement workers, along with other policy variables[3] as well as a wide range of other explanatory variables[4], in a wage equation, a strike incidence equation, and a strike duration equation for the subsample of strikes that occurred (Cramton, Gunderson and Tracy, forthcoming). The strike incidence and wage data are from the Major Wage Settlements database (for settlements of at least 500 workers) from Labour Canada. The strike duration data is from the Work Stoppage database (all stoppages of any size) from Labour Canada. The larger study should be consulted for a more detailed discussion of the data, the merging of the databases, the empirical specification, specification tests, endogeneity tests, the theory underlying the expected relationships, the rationale for the inclusion of the different variables, the related literature[5], and the results for the other

variables.

Before discussing the empirical results, two further caveats are in order. The subsequent discussion proceeds as though these are precise estimates of the impact that legislative bans on replacement workers have on wages and strike incidence and duration, as well as strike costs. We are perfectly aware that although these are "best" estimates in an econometric sense, there is considerable variation around those estimates. Nevertheless, the estimates could be underestimates just as well as they could be overestimates of the true effects; we have obviously tried to control for any systematic bias to the extent that the data permits.

We are also perfectly aware that we have dealt with only three dimensions of the issue -- the impact that legislative bans on replacement workers have on wages, strike incidence and strike duration. Other important dimensions -- picket line violence[6], post-strike return-to-work issues, the stability of the system through the balance of power, and distributional issues between striking workers and replacement workers -- are simply beyond the scope of the present analysis.

Impacts of Replacement Bans on Strike Incidence, Duration and Wages

Table 1 gives the marginal or incremental effect that a legislative replacement ban has on strike incidence, strike duration and real wages. As indicated in the first row, the legislative ban increases strike incidence by 0.122 -- a large effect, given that the average strike incidence or probability that a strike will occur is 0.165. Alternatively stated, the expected probability of a strike occurring in a given contract negotiation is 0.269 when the ban is in place, compared to 0.147 when the ban is not in place[7]. This is the largest impact on strike incidence of any of the policy variables.

While this is a large effect, it is measured with some imprecision, being significant only at the 0.107 level. For this reason, the result should be used with caution; it is a large effect, but there is considerable uncertainty around that large effect.

As indicated in the second row of Table 1, based on the strike duration equation estimated on all strikes, the legislative ban on replacement workers increases strike duration by 31.6 days -- a large effect relative to the average conditional strike duration of 59 days for strikes that occurred. Alternatively stated, the expected duration of a strike if it occurs is 86 days when bans are in place and 54.3 days when they are not in place (note c of Table 1). As with the strike incidence effect, this impact on strike duration is the largest of all of the policy variables. In this case, its impact is more precisely estimated, being statistically significant at the 0.001 level[8].

Although not estimated directly, we calculate the impact that a legislative replacement ban has on unconditional strike duration -- the product of the probability of a strike occurring times the expected strike duration conditional upon a strike occurring. As indicated in the third row of Table 1, the legislative replacement ban is associated with an increase in unconditional strike duration of 15 days. This effect is large relative to the average unconditional duration of 7.2 days reflecting the fact that a replacement ban increases both the incidence of strikes and their conditional duration.

Reflecting the enhanced bargaining power of unions when employers are unable to use strike replacements, the ban is associated with real wage increases of 4.4 percent over the life of a contract. Since the average contract lasts for 2.25 years, this amounts to almost 2 percent per year. This wage increase in the current contract also has a positive effect on wages in subsequent contracts (i.e., the coefficient on the previous contract wage is positive). The implied long-run effect of a replacement ban is a 14 percent wage increase[9].

Impacts of Replacement Bans on Employers and Unions

Table 2 combines the previous estimates with other calculations to illustrate the gains and losses to employers and unions from the legislative bans on replacement workers.

The gains to the union members essentially occur because the higher wages they receive as a result of their greater bargaining power emanating from the legislative ban considerably exceed the higher strike costs that result from the higher incidence and duration of strikes that also occur as a result of the legislative ban.

The top panel indicates that the average wage bill over the life of an average contract is $89.36 million -- the product of the average hourly wage of $13.81 dollars, times average daily hours of 7.2 hours, times the average contract duration of 587 paid working days, times the average number of employees in the bargaining unit of 1,531. The legislative ban on replacement workers is associated with a 0.044 increase in real wages over the life of the contract; when applied to the average wage bill of $89.36 million this yields a total wage increase of $3.9 million associated with the legislative ban.

The middle panel indicates that this wage gain for the union membership comes at the cost of the wage losses associated with the 15.1 additional strike days they can expect to experience as a result of the legislative ban on replacement workers. That increase in the (unconditional) number of strike days is a result of an increase in both the incidence of strikes and the duration of strikes that occur as a result of the legislative ban. The total additional strike cost as a result of the ban is $1.93 million -- the product of an additional 15.1 strike days, over an average of 1,531 bargaining unit members (converted to total person days lost), costing $99.43 in lost wages per day. Assuming that

the union and the employer equally share in those strike costs implies an average increase in strike costs of almost $1 million for each side.

As the bottom panel indicates, for a typical large bargaining unit, the net gain for the union is approximately $2.9 million dollars over the life of a contract, reflecting the fact that the wage gain of $3.9 million clearly outweighs their share of strike costs of approximately $1 million associated with the additional strike days. For the firm, the net losses average $4.8 million, which is the sum of the wage increases of $3.9 million and their share of strike costs of almost $1 million.

In essence, in a typical contract renegotiation in large bargaining units the union stands to gain almost $3 million and the firm stands to lose almost $5 million over the life of the contract if a legislative ban on replacement workers is in place[10]. The fact that the gain to the union is less than the loss to employers reflects the fact that approximately $2 million of lost wages and output is a real resource cost -- lost from the system as a result of the higher strike incidence and duration. With such large losses and redistributive effects from one party to the other, associated with almost $8 million being "on the table" in each bargaining round with respect to this issue, it is not surprising that the legislative ban on replacement workers generates such intense controversy.

TABLE 1 -- IMPACT OF BAN ON REPLACEMENT WORKERS ON STRIKE ACTIVITY AND WAGES

Dimension of Impact	Marginal Effect of Ban	Significance Level
Probability of strike occurring[a] (mean S = 0.165)	0.122[b]	0.107
Conditional strike duration if strike occurs[a] (mean D = 59 days)	31.6[c]	0.001
Unconditional strike duration, all contracts (mean DU = 7.2 days)[d]	15.1[e]	0.036
Real wages (mean = $11.31, 1986 Canadian dollars)		
Short-run	0.044	0.051
Long-run[f]	0.14	0.020

Source: Based on parameter estimates and descriptive statistics from Cramton, Gunderson and Tracy (forthcoming).

[a] Based on a specification that includes an indicator variable for there having been a strike in the previous contract. The coefficients and standard errors are almost identical to those from a specification where that variable is replaced by a series of step functions reflecting different segments of strike durations in the prior contract.

[b] Marginal effect or change in the probability of a strike occurring associated with the legislative ban on replacement workers being in place, compared to it not being in place, calculated from a probit regression, and evaluated at the mean strike probability of 0.165 for the sample.

[c] Based on the (ln) conditional strike duration equation, the proportionate increase in conditional strike duration associated with the replacement ban being in place is $(e^{0.46} - 1) = 0.58$, where 0.46 is the coefficient on the legislative ban variable. That is, $(D_b - D_n)/ D_n = 0.58$ where D_b is the conditional duration when the ban is in place and D_n when not in place. Since

$D = P*D_b + (1-P)*D_n$, where D = 59 days, the average conditional strike duration, and
P = 0.145, the proportion of contracts where the ban is in place, then
$D_n = 54.3$, $D_b = 86.0$ and $dD = D_b - D_n = 0.58D_n = 31.6$.

[d] The expected (unconditional) duration, DU, is the probability of a strike occurring, S, times the expected duration conditional upon a strike occurring, D; that is, DU = S*D = 0.122 (59) = 7.2 days.

[e] The change in unconditional duration, dU, is calculated as the difference between the unconditional duration when the ban is in place, DU_b, and when not in place, DU_n. That is,

$dU = DU_b - DU_n$.

Since the unconditional duration is the product of the incidence, S, and the conditional duration, D, then

$dU = S_b*D_b - S_n*D_n$
$= 0.269(86) - 0.147(54.4) = 15.13$ days,

where D_b and D_n are from footnote C, and S_b and S_n are calculated from the identities

$S = PS_b + (1-P)S_n$ and $dS = S_b - S_n$

where S = 0.165 the average strike incidence
P = 0.145 the proportion of contracts with a ban on replacements
dS = 0.1219 the marginal effect of the ban calculated from the incidence probit.

[f] Calculated as the coefficient on the replacement ban variable divided by 1 minus the coefficient on the lagged wage variable, as outlined in the text.

TABLE 2 -- GAINS AND LOSSES TO EMPLOYERS AND UNION FROM BAN ON REPLACEMENTS

Symbol	Measure	Magnitude
	Wage Gain to the Union	
w	Mean hourly wage, 1993 Canadian dollars	13.81
h	Mean hours per day	7.2
l	Mean contract duration in working days[a]	587
n	Mean number employees in bargaining unit	1,531
whln	Mean wage bill over life of contract ($ millions)	89.36
%W	Proportionate increase in wage due to replacement ban	0.044
G=%W[whln]	Total wage gain due to replacement ban ($ millions)	3.9
	Strike Costs	
c=wh	Daily strike cost, lost wages, per day (dollars)	99.43
S	Mean strike incidence	0.165
D	Mean (conditional) strike duration, in days	59
DU=S*D	Mean unconditional strike duration, days	9.74
dD	Increase in unconditional strike duration due to replacement ban, in days	15.1
n	Mean number employees in bargaining unit	1,531
dC=dDwhn	Increase in strike cost due to legislative ban ($ millions)	1.93
	Gains and Losses to Parties	
G-dC/2	Union net gain {3.9 - (1.93)/2} in ($ millions)	2.91
-G-dC/2	Firm's net loss {-3.9 - (1.93/2} in ($ millions)	-4.84

Source: Calculations from numbers provided in Cramton, Gunderson and Tracy (forthcoming, Table 8). All figures are estimates from the econometric analysis or calculated from the sample data except average hours worked per day, which is the average hours worked per week, divided by 5, for persons in manufacturing (from CANSIM code I191206. The increase in unconditional strike duration due to the replacement ban is calculated as discussed in the text.

Notes: [a] Mean contract duration of 822 days times 5/7 to convert to paid working days.

REFERENCES

Budd, John W. 1996. "Canadian Strike Replacement Legislation and Collective Bargaining: Lessons for the United States." *Industrial Relations,* Vol. 35 (April), pp. 245-260.

-------, 1997. "The Effect of Strike Replacement Law on Employment." Working Paper, University of Minnesota Industrial Relations Center.

Cramton, Peter C., Joseph S. Tracy and Morley Gunderson. forthcoming. "The Effect of Collective Bargaining Legislation on Strikes and Wages." *Review of Economics and Statistics*.

-------, and Joseph S. Tracy. 1992. "Strikes and Holdouts in Wage Bargaining: Theory and Data." *American Economic Review*, Vol. 82 (March), pp. 100-121.

------, and Joseph S. Tracy. 1994. "The Determinants of U.S. Labor Disputes." *Journal of Labor Economics,* Vol. 12 (April), pp. 180-209.

------, and Joseph S. Tracy. 1998. "The Use of Replacement Workers in Union Contract Negotiations: The U.S. Experience, 1980-1989." *Journal of Labor Economics,* Vol. 16 (October), pp. 667-701.

Gunderson, Morley, John Kervin, and Frank Reid. 1986. "Logit Estimates of Strike Incidence from Canadian Contract Data." *Journal of Labor Economics*, Vol. 4 (April), pp. 257-276.

------, John Kervin, and Frank Reid. 1989. "The Effects of Labour Relations on Strike Incidence." *Canadian Journal of Economics*, Vol. 22 (November), pp. 779-794.

------, and Angelo Melino. 1990. "The Effects of Public Policy on Strike Duration." *Journal of Labor Economics,* Vol. 8 (July), pp. 296-316.

Singh, Parbudyal, and Harish Jain. 1997. "Strike Replacement Laws in Canada, Mexico and the United States: Policies and Issues." *Canadian Labour and Employment Law Journal*, Vol. 5 (285-320).

ENDNOTES

1. Budd (1996, 1997) and Singh and Jain (1997) provide a detailed description of the legislative bans on replacement workers in Canada, highlighting the distinction between bans on temporary replacements, professional strikebreakers, and permanent replacements, the later occurring directly or indirectly through guaranteeing striking workers their jobs after the strike.

2. Cramton and Tracy (1992, 1994) document and analyze the sharp rise in "holdout" disputes that has occurred in the United States since the 1970s, and that has more than offset the fall in strikes as a form of dispute.

3. We are indebted to John Budd of the University of Minnesota for providing us his coding of the policy variables based on an examination of the original statutes.

4. In addition to the replacement ban, the other policy variables include requirements for a conciliation officer, a conciliation board, a cooling-off period, a mandatory strike vote, an employer-initiated vote option, a compulsory dues checkoff, a right to reopen negotiations, and a right to reopen negotiations in the event of technological change. The other control variables included the percentage wage change over the prior contract, the existence of an anti-inflation program, the previous contract duration, the bargaining unit size, the provincial unemployment rate, the use of conciliation or mediation in the prior contract, the existence of a strike in the prior contract, and dummy variables for the season, year, region, union, and industry.

5. Earlier Canadian studies of the impact of policy variables including bans on replacement workers include Budd (1996, 1997), Gunderson, Kervin and Reid (1986, 1989), and Gunderson and Melino (1990).

6. Based on U.S. data, Cramton and Tracy (1995) find strike violence to be substantially higher when replacements are used.

7. $dS / S_b - S_n = 0.122$, the marginal effect of the legislative ban as discussed in footnote c of Table 1. S_b is strike incidence when the ban is in place and S_n when it is not in place. Also,

$S / P*S_b + (1-P)*S_n$, where S = 0.165, the average strike incidence, and P = 0.145, the proportion of contracts where the ban is in place. After appropriate substitutions, this yields

$S_n = 0.147$ and $S_b = 0.269$.

8. The coefficient on the legislative ban is over twice as large (1.29 compared to 0.46) when estimated only on the subsample of large strikes in bargaining units of over 500 employees. However, it is more imprecisely estimated, being significant only at the 0.086 level. Our preferred estimate is based on the larger data set of 12,929 strikes compared to 706 strikes in the larger bargaining units, since it enables us to measure the duration effects more precisely. The fact that our estimate based on all strikes is smaller than the one based on larger bargaining units suggests that it is a conservative estimate of the impact on strike duration.

9. Our wage equation is $\ln W_t = aX + ßW_{t-1} + ... = 0.044X + 0.685W_{t-1} + ...$, where X is the legislated ban on replacement workers and W_{t-1} is lagged wages. The short-run effect of the ban is the coefficient on X, indicating that the ban increases wages by 4.4% over the life of a contract. In the long-run, however, the coefficient on the lagged wage variable indicates that 68.5% of that effect gets embedded into wages in the next round, and a further 68.5% of that gets embedded into the

subsequent round, and so forth. That is, the long-run effect is:

LR = 0.044 + 0.044(0.685) + 0.044$(0.685)^2$ + .. = (1 + 0.685 + 0.685^2 + ..) 0.044 = 14. More generally LR = a/(1-ß) where a is the coefficient on the replacement ban and ß is the coefficient on the lagged wage variable

10. These are likely to be conservative estimates for a variety of reasons. We used the conditional strike duration effect based on the larger sample of all strikes which was approximately one-half of the effect based on the subsample of large strikes. We used only the short-run and not long-run wage effect which was much larger. Our strike costs were based only on the wage bill and did not include such factors as loss of market share, difficulties in negotiating subsequent supply and delivery contracts, and overtime costs to restore lost inventories.